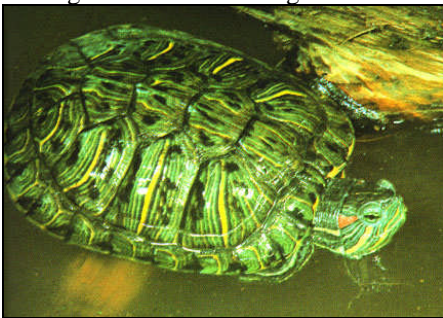


**The *Nonindigenous Aquatic Species Program* tracks the status and distribution of introduced aquatic organisms and provides this information in a timely manner for research, management and education.**

Nonindigenous species are ranked second only to habitat loss in the agents that threaten native biodiversity, however the geographic distribution of many of these organisms are poorly understood. As new taxa are introduced and the range of those previously established continues to increase, precise tracking of their status and distribution is imperative for decision-making and resource management.



**The Nonindigenous Aquatic Species Program (NAS)** neatly parallels several major directives of the 1999 Executive Order on Invasive Species by offering a relevant program to detect, monitor, conduct research and promote public education on invasive species. Likewise it meets a science priority of the USGS and BRD by determining the status of biological resources in aquatic systems.

An expansive spatial database underlies the NAS program, which has been under development since 1978. It supports the underlying role of the NAS program, which is to provide a continual national assessment of the status and distribution of nonindigenous aquatic species.

**The NAS database** functions as a repository and central clearinghouse for occurrence information from across the country. It contains locality information on more than 1100 species introduced as early as 1850. Vertebrates, invertebrates, algae and vascular plants are tracked. Taxa include foreign species as well as those native to North America that have been transported outside of their natural range. Locality data is obtained from many sources including the literature, state,

federal and local monitoring programs, museum accessions, on-line databases, professional communications and reporting forms. Before including in the database, records are critically reviewed then geographically referenced to the finest USGS hydrologic unit in order to correlate locality data with river drainage. USGS hydrologic units are commonly employed by natural resource agencies for referencing many types of environmental data, physical as well as biological, and implemented for management at the watershed level.

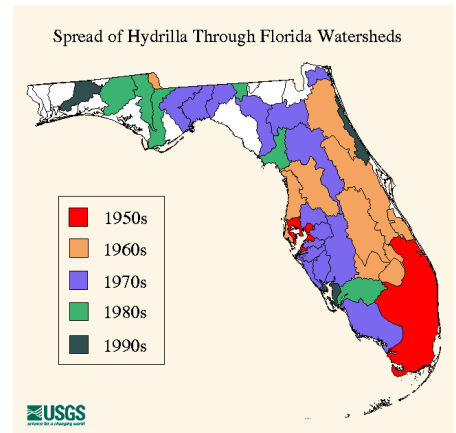
**The NAS website** (<http://nas.er.usgs.gov>) provides immediate access to new occurrence records through a real-time interface with the NAS database. Web site users can perform automatic queries to obtain lists of species according to state or hydrologic basin of interest. Fact sheets, distribution maps and news on new occurrences are continually posted and updated. Staff may be contacted for specific data, custom products and reports. The NAS web site also provides information on reports and meetings and links to relevant sites.

### Program Goals

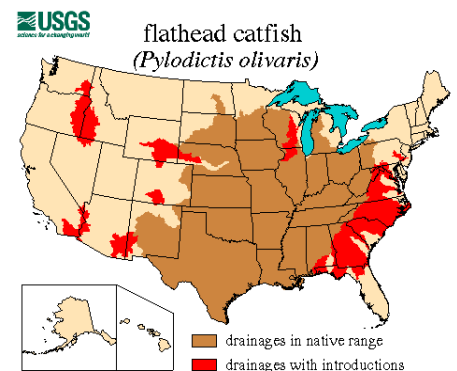
- 1) Develop and provide an accurate ongoing assessment of the status and distribution of nonindigenous aquatic species nationwide.
- 2) Identify geographic gaps in knowledge of the distribution of introduced aquatic organisms.
- 3) Gain an understanding of the scope and scale of aquatic introductions in the United States.

### Applications of the NAS program

- **Maps** – Maps may illustrate the dynamics of distribution.



Other maps may pinpoint problem drainages or assess vulnerability.

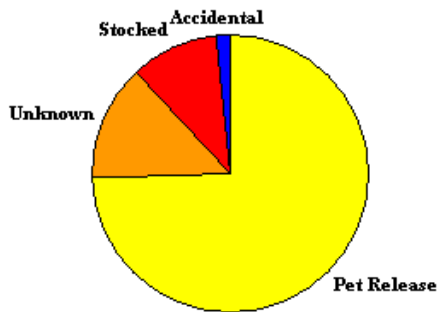


- **Risk Assessment** – Analysis of distribution records has been instrumental in developing state legislation on prohibited species.

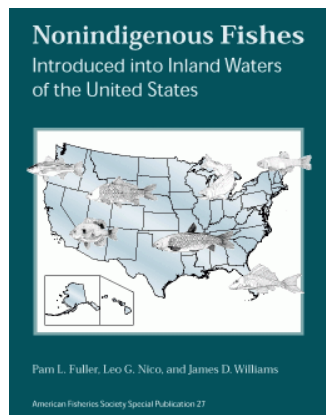


- **Predicting Spread** – Determined distribution of well established species might be used in estimating the potential spread of new species with similar origin or biological attributes.
- **Pathway analysis** – Methods or pathways of introduction include intentional and unintentional stocking, pet and aquarium releases, ballast water, bait release and escape from cultivation or captivity.

#### Pathways of Reptile Introduction:

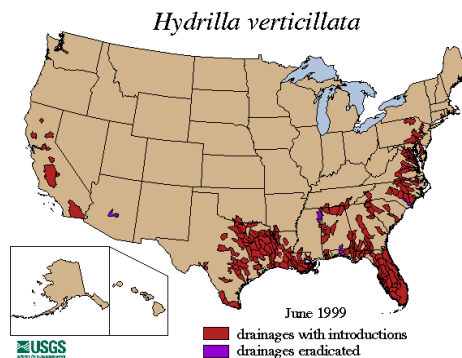


- **Publication** products include peer-reviewed papers, book chapters, books, fact sheets and alert fliers. The Nonindigenous Fishes book, published 1999 by the American Fisheries Society, is based on more than 20 years of research. It summarizes the historical trends and spatial patterns of fish introductions nationwide.



## A Few Facts from the NAS Database

- Nonindigenous species have been recorded from nearly every aquatic system in the United States.
- One of the nations top problem aquatic weeds, hydrilla, currently infests 213 drainages in 28 states.



- In 20 years, both zebra and quagga mussels have spread to waters of 29 states. Currently they have been detected in over 500 lakes in the US.



- More than 500 fish species have been introduced in the U.S., one-third are foreign the remaining are native species transported outside of their natural range.

- Introduced through the aquarium trade to 15 states, the snail *Melanoides tuberculata*, has been found carrying parasites fatal to native fish species in Texas.



- Introduction of the flathead catfish can lead to the demise of native sunfish and bullheads through predation. This species has been introduced to 17 states outside of its native range, both legally and illegally for sport fishing and through stock contamination.



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